



THE AERONAUTICAL JOURNAL

MAY 1971

EXHIBITORS AT PARIS AIR SHOW 1971

THE PRESIDENT 1971/72

NOTICES

IS THERE A FUTURE FOR EUROPE IN AEROSPACE?

R. Hotz

THE MAJOR DEVELOPMENT TRENDS IN AIR TRANSPORT AND EUROPEAN
CO-OPERATION

H. Ziegler

THE PROGRESS AND ECONOMICS OF THE AERO ENGINE

M. Garnier

THE FAR EAST FLIGHT OF THE SOUTHAMPTON FLYING BOATS, 1927/28

Gp. Capt. G. E. Livock

TECHNICAL NOTES

A Method of Flow Stabilisation with High Pressure Recovery in Short,
Conical Diffusers

D. M. Rao

Some Measured and Calculated Effects of Runway Unevenness on a
Supersonic Transport Aircraft

C. G. B. Mitchell

Calculation of the Normal-Stress Distribution in a Curved Wall Jet

R. J. Kind

Linearised Analysis of a Damped Gravity Orientated Satellite

**C. Tschann and
V. J. Modi**

CORRESPONDENCE

THE LIBRARY

SUPPLEMENTARY PAPERS

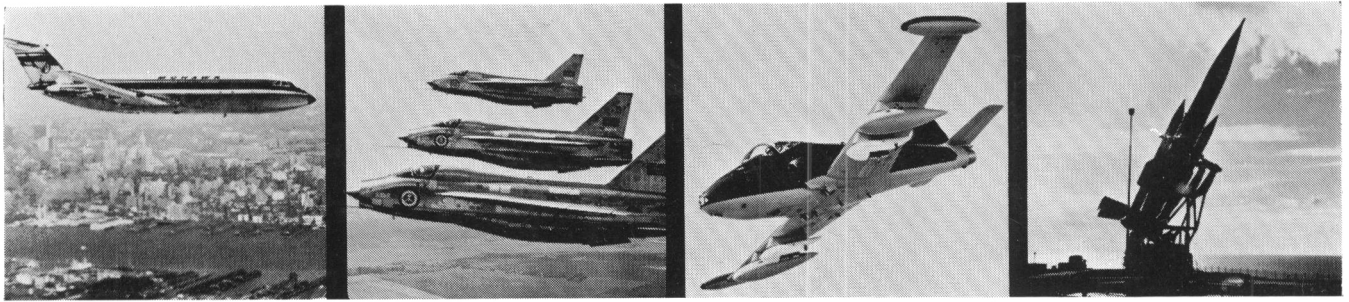
FLUIDIC CABIN PRESSURE CONTROL SYSTEMS FOR MILITARY AND CIVIL
AIRCRAFT

O. D. Furlong

THE ROYAL AERONAUTICAL SOCIETY

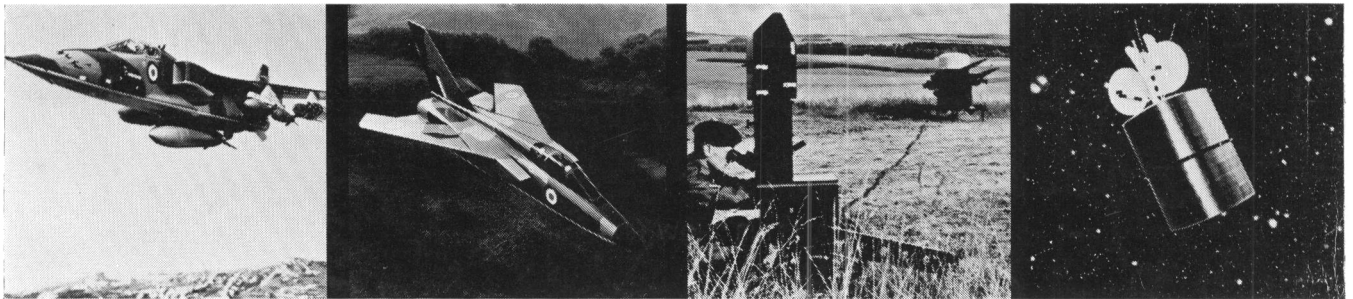
4 HAMILTON PLACE LONDON W1

\$3,500,000,000 worth of BAC products



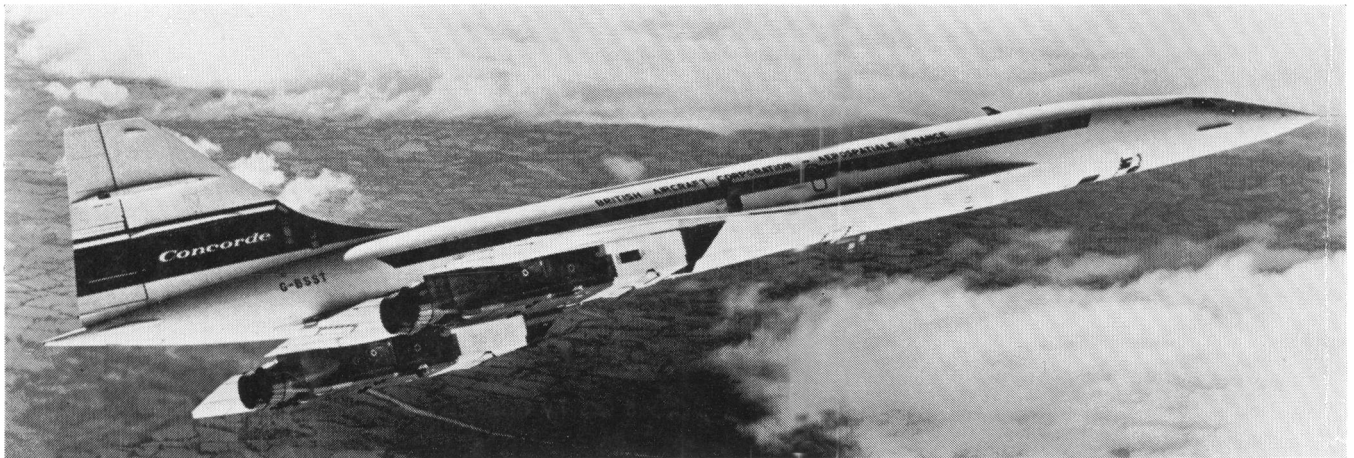
BAC One-Eleven, Lightning, BAC 167 Strikemaster and Thunderbird are among the aircraft and missile systems which have made BAC a world force in aerospace.

are in service.



Jaguar, the Panavia MRCA, the Rapier missile system, and space programmes such as Intelsat IV provide a broad base for BAC's drive for larger world markets.

In the future



The Concorde supersonic airliner, designed and built by BAC in collaboration with Aérospatiale of France, will revolutionise the world's long-distance air travel.

we will double it.



BRITISH AIRCRAFT CORPORATION
the most powerful aerospace company in Europe

100 PALL MALL LONDON SW1

THE AERONAUTICAL JOURNAL

THE ROYAL AERONAUTICAL SOCIETY

Incorporating The Institution of Aeronautical Engineers and The Helicopter Association of Great Britain

Telephone: 01-499 3515 Telegrams: Didaskalos, London, W1

Published Monthly at 4 HAMILTON PLACE, LONDON W1V 0BQ

Subscriptions: £15 15s. Od. (£15.75) per annum, post free
Single Copies, including back numbers: 30s. (£1.50)

VOLUME 75

NUMBER 725

MAY 1971

CONTENTS

Page

EXHIBITORS AT PARIS AIR SHOW 1971

THE PRESIDENT 1971/72

xvii

NOTICES

xviii

R. Hotz IS THERE A FUTURE FOR EUROPE IN AEROSPACE?

305

H. Ziegler THE MAJOR DEVELOPMENT TRENDS IN AIR TRANSPORT AND EUROPEAN
CO-OPERATION

309

M. Garnier THE PROGRESS AND ECONOMICS OF THE AERO ENGINE

320

Gp. Capt. G. E. Livock THE FAR EAST FLIGHT OF THE SOUTHAMPTON FLYING BOATS, 1927/28

327

TECHNICAL NOTES

336

D. M. Rao A Method of Flow Stabilisation with High Pressure Recovery in Short,
Conical Diffusers

C. G. B. Mitchell Some Measured and Calculated Effects of Runway Unevenness on a
Supersonic Transport Aircraft

R. J. Kind Calculation of the Normal-Stress Distribution in a Curved Wall Jet

**C. Tschann and
V. J. Modi** Linearised Analysis of a Damped Gravity Orientated Satellite

CORRESPONDENCE

353

THE LIBRARY

354

SUPPLEMENTARY PAPERS

O. D. Furlong FLUIDIC CABIN PRESSURE CONTROL SYSTEMS FOR MILITARY AND CIVIL
AIRCRAFT

361

Editor: G. R. WRIXON, ARAeS.

Secretary of the Society: A. M. BALLANTYNE, OBE, TD, BSc,
PhD, CEng, HonFCASI, FAIAA, FRAeS.

4 HAMILTON PLACE, LONDON, W1V 0BQ. Tel:01-4993515.

Advertisements Only:

H. E. SOUTHON

Magazine Advertising Ltd, 184 Fleet Street, London, EC4.

Tel: 01-405 6279 & 01-405 3363.

**Reproduction of any of the papers published in this journal is
not permitted without the written consent of the Editor.**

*None of the papers or paragraphs must be taken as
expressing the opinion of the Council unless otherwise stated.*

PRINTED BY THE LEWES PRESS LTD, FRIARS WALK, LEWES, SUSSEX, ENGLAND, AND PUBLISHED
BY THE ROYAL AERONAUTICAL SOCIETY, 4 HAMILTON PLACE, LONDON, W1V 0BQ, ENGLAND.

DIVISIONS AND BRANCHES OF THE ROYAL AERONAUTICAL SOCIETY

Australia Branches at: Canberra, Sydney, Melbourne and Adelaide.

President: P. S. LANGFORD, FRAeS. *Hon. Secretary:* B. A. J. SCOLLES, AFRAeS, 191 Royal Parade, Parkville, Victoria 3052.

Rhodesia Branches at: Bulawayo, Gwelo and Salisbury.

Hon. President: Sir HUMPHREY GIBBS, KCMG, OBE. *President:* G. A. FORD AFRAeS. *Hon. Secretary:* Sqn. Ldr. D. Butler, P.O. Box 3759, Salisbury, Rhodesia.

New Zealand Branches at: Auckland, Wellington, Palmerston North and Christchurch.

President: Gp. Capt. G. E. WATT, FRAeS. *Hon. Secretary:* A. A. HOFFMAN, ARAeS, New Zealand National Airways Corp'n, P.O. Box 96, Wellington.

Southern Africa Branches at: Johannesburg, Pretoria, Cape Western and Durban.

President: M. S. HUNT, FRAeS. *Hon. Secretary:* Col. F. W. CARNELL, AFRAeS, 11 Staal Road, Valhalla, Pretoria District.

Bedford

President: Professor D. KEITH-LUCAS, FRAeS.
Chairman: D. LEAN, FRAeS.
Hon. Secretary: D. M. RICHARDS, AFRAeS, Dept. of Aircraft Design, Cranfield Institute of Technology, Cranfield, Bedford. *Tel:* Bedford 51551.

Belfast

President: P. F. FOREMAN, FRAeS.
Chairman: C. D. HATTON, FRAeS.
Hon. Secretary: T. E. MORRISON, AFRAeS, Dept. of Mechanical Engineering College of Technology, College Square East, Belfast BT1 6DJ. *Tel:* Belfast 27244.

Birmingham and Wolverhampton

President: N. H. SHUTTLEWORTH, AFRAeS.
Chairman: R. F. HOLDNALL, ARAeS.
Hon. Secretary: T. J. HAMMOND, H. M. Hobson Ltd., Fordhouses, Wolverhampton WV10 7EH. *Tel:* Fordhouses 2381.

Boscombe Down

President: Air Cdre. R. L. TOPP, AFC.
Chairman: J. C. MORRALL, AFRAeS.
Hon. Secretary: Sqn. Ldr. A. A. CLARK, AFRAeS, ETPS, A & AEE, Boscombe Down, Amesbury, Salisbury, Wilts. *Tel:* Amesbury 3331.

Bristol

President: D. ROWLEY, FRAeS.
Chairman: N. H. WOOD, AFRAeS.
Hon. Secretary: N. L. ANGELL, AFRAeS, Rolls-Royce Ltd, BED Quality Dept, Filton, Bristol. *Tel:* Bristol 693871.

Brough

President: J. WHITE, FRAeS.
Chairman: E. WILKS, AFRAeS.
Hon. Secretary: J. R. WALL, Grad RAeS, c/o Hawker Siddeley Aviation Ltd, Brough, HU15 1EQ. *Tel:* Brough 667121.

Cambridge

President: Professor W. A. MAIR, FRAeS.
Chairman: N. A. J. HARRY, AFRAeS.
Hon. Secretary: D. J. COLE, Marshall of Cambridge (Engineering) Ltd, The Airport, Cambridge. *Tel:* Cambridge 56291.

Chester

President: K. G. HANCOCK, FRAeS.
Chairman: F. S. GLEW, AFRAeS.
Hon. Secretary: V. W. CLARKSON, AFRAeS, Hawker Siddeley Aviation Ltd, Broughton, Chester. *Tel:* Chester 24646.

Christchurch

President: E. W. J. GRAY, FRAeS.
Chairman: D. E. CAILES, AFRAeS.
Hon. Secretary: R. C. FUTCHER AFRAeS, BAC Ltd, Bournemouth (Hurn) Airport, Christchurch, Hants. *Tel:* Northbourne 3201.

Coventry

President: R. W. F. FARTHING, FRAeS.
Chairman: R. A. FIELD, AFRAeS.
Hon. Secretary: J. KIRKLAND, AFRAeS, Dunlop Aviation Division, Design Dept, Holbrook Lane, Foleshill, Coventry. *Tel:* Coventry 88733.

Cranwell

President: Air Vice Marshal F. D. HUGHES, CBE, DSO, DFC, AFC.
Chairman: Wg. Cdr. B. DICKINSON, MBE, AFRAeS.
Hon. Secretary: F. A. BRISTOW, AFRAeS, Dept of Engineering, RAF College, Cranwell, Sleaford, Lincs. *Tel:* Cranwell 201.

Derby

President: Sir DENNING PEARSON, HonFRAeS.
Chairman: S. L. BRAGG, FRAeS.
Hon. Secretary: J. R. COWNIE, AFRAeS, Rolls-Royce Ltd, Derby, DE2 8BJ. *Tel:* Derby 42424.

Dublin

President: Capt. J. C. KELLY-ROGERS, OBE, FRAeS.
Chairman: T. BONNER.
Hon. Secretary: S. LYTTLE, AFRAeS, 4 Riversdale Avenue, Terenure, Dublin 6.

Glasgow

President: Dr. A. W. BABISTER, AFRAeS.
Chairman: J. SACHARIN, AFRAeS.
Hon. Secretary: T. K. BLACK, 43 Partick-Hill Road, Glasgow, W1.

Gloucester and Cheltenham

President: Sir GEORGE DOWTY, HonFRAeS.
Chairman: R. J. HARMAN, AFRAeS.
Hon. Secretary: R. W. WHITE, AFRAeS, c/o Smiths Industries Ltd, Bishops Cleeve, Cheltenham, Glos. *Tel:* Bishops Cleeve 3333.

Halton

President: Air Vice-Marshal R. E. W. HARLAND, FRAeS.
Chairman: Gp. Capt. R. D. BATER, AFRAeS.
Hon. Secretary: Flt. Lt. C. R. MILES, Officers' Mess, RAF Halton, Bucks. *Tel:* Wendover 2241.

Hatfield

President: Sir HARRY BROADHURST.
Chairman: C. F. BETHWAITE, FRAeS.
Hon. Secretary: G. B. EVANS, FRAeS, Drawing Office, Hawker Siddeley Aviation Ltd, Hatfield, Herts. *Tel:* Hatfield 62345.

Isle of Wight

President: L. BODDINGTON, CEB, FRAeS.
Chairman: D. J. HARDY, AFRAeS.
Hon. Secretary: H. A. POOK, AFRAeS, British Hovercraft Corporation Ltd, East Cowes, Isle of Wight. *Tel:* Cowes 4121.

London Airport

President: C. ABELL, OBE, FRAeS.
Chairman: A. S. HUGHES, ARAeS.
Hon. Secretary: N. BROWN, ARAeS, Technical Publications, Technical Block A, G.2, BOAC, PO Box 10, Hounslow, Middlesex. *Tel:* Skyport 5511.

Loughborough

President: Professor K. L. C. LEGG, FRAeS.
Chairman: Dr. K. B. AYERS, FRAeS.
Hon. Secretary: P. W. SHARMAN, AFRAeS, University of Technology, Dept. of Transport Technology, Loughborough, Leics. LE11 3TU. *Tel:* Loughborough 63171.

Luton and Stevenage

President: G. R. JEFFERSON, OBE, FRAeS.
Chairman: Dr. W. F. HILTON, FRAeS.
Hon. Secretary: D. B. COLLINS, ARAeS, Rotax Aircraft Equipment Ltd, Specification Dept., Luton Airport, Beds. *Tel:* Luton 31441.

Manchester

President: C. E. FIELDING, OBE, FRAeS.
Chairman: G. A. WHITEHEAD, CBE, FRAeS.
Hon. Secretary: J. A. E. WATERFALL, 137 Walton Road, Sale, Cheshire. *Tel:* 061 962 1695.

Merthyr and Treforest

President: G. W. MOORE.
Chairman: E. R. CHAYTOR, AFRAeS.
Hon. Secretary: Dr. G. O. FORESTER, AFRAeS, Chief of Research, Teddington Aircraft Controls Ltd, Cefn Coed, Merthyr Tydfil, South Wales. *Tel:* Merthyr Tydfil 3261.

Preston

President: F. D. CROWE, FRAeS.
Chairman: F. E. ROE, FRAeS.
Hon. Secretary: L. A. WILLOTT, AFRAeS, BAC Ltd, Preston Division, Warton Aerodrome, Preston, Lancashire. *Tel:* Freckleton 531.

Prestwick

President: R. McINTYRE, FRAeS.
Chairman: J. LOGAN, AFRAeS.
Hon. Secretary: A. R. FROST, ARAeS, Scottish Aviation Ltd, Planning Dept., Prestwick Airport, Ayrshire. *Tel:* Prestwick 79888.

Reading

President: E. N. MOBBS.
Chairman: J. T. APPELBY, FRAeS.
Hon. Secretary: K. O. SCOTT, AFRAeS, M.L. Aviation Co Ltd, White Waltham, Maidenhead, Berks. *Tel:* Littlewick Green 3361.

Southampton

President: A. N. CLIFTON, FRAeS.
Chairman: D. C. EVANS, AFC.
Hon. Secretary: P. W. FORTESCUE, AFRAeS, Dept. of Aeronautics and Astronautics, The University, Southampton, SO9 5NH. *Tel:* Southampton 56331.

Southend

President: J. R. BATT, AFRAeS.
Chairman: B. R. DAY, ARAeS.
Hon. Secretary: Mrs. M. SOLMAN, 6 Cedar Walk, Canewdon, Nr Rochford, Essex.

Swindon

President: W. GILLESPIE, AFRAeS.
Chairman: G. M. MOSS, AFRAeS.
Hon. Secretary: G. N. GINGELL, AFRAeS, Vickers Ltd, South Marston, Swindon, Wilts. *Tel:* Stratton St. Margaret 3241.

Weybridge

President: Sir GEORGE EDWARDS, CBE, FRS, HonFRAeS.
Chairman: N. W. BOORER, FRAeS.
Hon. Secretary: A. M. DOBSON, AFRAeS, BAC Ltd, Weybridge Division, Weybridge, Surrey. *Tel:* Weybridge 45555.

Yeovil

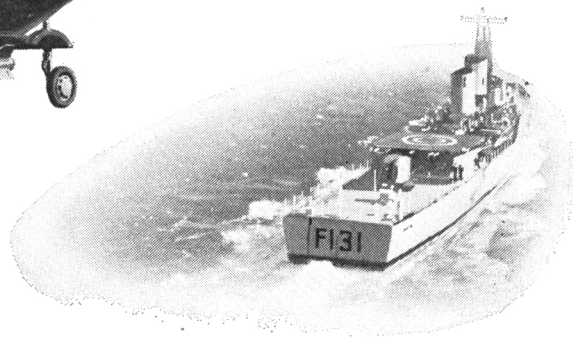
President: Dr. G. S. HISLOP, FRAeS.
Chairman: Dr. J. P. JONES, FRAeS.
Hon. Secretary: F. N. R. BALLAM, ARAeS, Westland Aircraft Ltd, Yeovil, Somerset. *Tel:* Yeovil 5222.

MAY 1971

PER TERRAM



PER MARE



The Westland

Lynx

The Westland Lynx is an advanced frigate-based anti-submarine and surface search/strike helicopter, and a versatile maid of all work for land forces. A high speed highly manoeuvrable twin-turbine helicopter with full engine out capability, the Lynx is a multi-service aircraft with a high degree of component commonality between the various versions.

Army version

Operational versatility - Rugged and compact - Tactical transport - Logistic support - Armed reconnaissance - Anti-tank strike - Battlefield surveillance - Casualty evacuation.

Naval version

Advanced ASW avionics - Surface strike capacity - All-weather operation - Special high absorption undercarriage coupled with advanced pilot operated harpoon system for rapid and positive deck securing - Search and rescue - Vertical replenishment.

Being supplied to the Royal Navy, British Army, Royal Air Force and the French Navy under the terms of the Anglo-French co-operation agreement.

Backed by years of experience of the Westland Wasp, the only helicopter specifically designed for rough weather operation from small ships.



Westland Helicopters Limited

Yeovil, England

Aérospatiale

2 a 20, Av. Marcel Cachin,
93 la Courneuve, France



Partners in European Co-operation

Three of the finest civil aircraft in the world, designed and built by Hawker Siddeley.

The HS 125. Well over 200 of these business jets are in service throughout the world, of which more than 130 are in North America.

The Hawker Siddeley Trident Three is the latest version in a family of jet airliners for the high density shorter routes throughout the world. The Trident Two operates the longer range regional services.

The HS 748, rugged turbo-prop feederliner, can operate in the toughest parts of the globe. Around 230 HS 748's have been ordered.

Hawker Siddeley also has a major role in the design and production of Europe's A300B Airbus, which will enter service in 1973.

All Hawker Siddeley products are backed by a world-wide network of spares and servicing facilities throughout the world with manufacturing resources in four continents.



HAWKER SIDDELEY AVIATION

Kingston upon Thames, England

Hawker Siddeley Group supplies mechanical, electrical and aerospace equipment with world-wide sales and service.